

UC Santa Barbara

Core Curriculum-Geographic Information Systems (1990)

Title

Outline of the Core Curriculum in GIS

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The NCGIA Core Curriculum in GIS Outline

INTRODUCTION TO GIS

A. Introduction

[Unit 1 - What is GIS?](#) (David Cowen)

[Unit 2 - Maps and Map Analysis](#) (David Rhind)

[Unit 3 - Introduction to Computers](#) (NCGIA)

B. A first view of GIS

[Unit 4 - The Raster GIS](#) (Dana Tomlin)

[Unit 5 - Raster GIS Capabilities](#) (Micha Pazner)

C. Data acquisition

[Unit 6 - Sampling the World](#) (Timothy L. Nyerges)

[Unit 7 - Data Input](#) (Jeffrey L. Star)

[Unit 8 - Socio-Economic Data](#) (Hugh Calkins)

[Unit 9 - Environmental and Natural Resource Data](#) (Charles Parson & Jeffrey L. Star)

D. Spatial databases

[Unit 10 - Spatial Databases as Models of Reality](#) (Timothy L. Nyerges)

[Unit 11 - Spatial Objects and Database Models](#) (Timothy L. Nyerges)

[Unit 12 - Relationships Among Spatial Objects](#) (Gerald White)

E. Vector view of GIS

[Unit 13 - The Vector or Object GIS](#) (Holly J. Dickinson, Michael F. Goodchild & Karen K. Kemp)

[Unit 14 - Vector GIS Capabilities](#) (Holly J. Dickinson)

F. Using the GIS

[Unit 15 - Spatial Relationships in Spatial Analysis](#) (NCGIA)

[Unit 16 - Output](#) (Jeffrey L. Star)

[Unit 17 - Graphic Output Design Issues](#) (NCGIA)

[Unit 18 - Modes of User/GIS Interaction](#) (Doug Banting)

[Unit 19 - Generating Complex Products](#) (Doug Banting)

[Unit 20 - GIS as Archives](#) (NCGIA)

G. Past, present and future

[Unit 21 - The Raster/Vector Database Debate](#) (Charles Parson)

[Unit 22 - The Object/Layer Debate](#) (NCGIA)

[Unit 23 - History of GIS](#) (NCGIA)

[Unit 24 - GIS Marketplace](#) (Doug Banting)

[Unit 25 - Trends in GIS](#) (Jack Dangermond)

TECHNICAL ISSUES IN GIS

H. Coordinate systems & geocoding

[Unit 26 - General Coordinate Systems](#) (NCGIA)

[Unit 27 - Map Projections](#) (Vicki Chmill)

[Unit 28 - Affine and Curvilinear Transformations](#) (NCGIA)

[Unit 29 - Discrete Georeferencing](#) (NCGIA)

I. Vector data structures & algorithms

[Unit 30 - Storage of Complex Objects](#) (David H. Douglas)

[Unit 31 - Efficient Storage of Lines - Chain Codes](#) (David H. Douglas)

[Unit 32 - Simple Algorithms I - Intersection of Lines](#) (David H. Douglas & David M. Mark)

[Unit 33 - Simple Algorithms II - Polygons](#) (NCGIA)

[Unit 34 - The Polygon Overlay Operation](#) (Denis White)

J. Raster data structures & algorithms

[Unit 35 - Raster Storage](#) (Donna Peuquet)

[Unit 36 - Hierarchical Data Structures](#) (NCGIA)

[Unit 37 - Quadtree Algorithms and Spatial Indexes](#) (NCGIA)

K. Data structures & algorithms for surfaces, volumes & time

[Unit 38 - Digital Elevation Models](#) (Brian Klinkenberg)

[Unit 39 - The TIN Model](#) (Thomas K. Poiker)

[Unit 40 - Spatial Interpolation I](#) (Nigel M. Waters)

[Unit 41 - Spatial Interpolation II](#) (Nigel M. Waters)

[Unit 42 - Temporal and Three-Dimensional Representations](#) (John H. Ganter)

L. Databases for GIS

[Unit 43 - Database Concepts I](#) (Gerald White)

[Unit 44 - Database Concepts II](#) (Gerald White)

M. Error modeling & data uncertainty

[Unit 45 - Accuracy of Spatial Databases](#) (Nicholas R. Chrisman & Matt McGranaghan)

[Unit 46 - Managing Error](#) (NCGIA)

[Unit 47 - Fractals](#) (Brian Klinkenberg)

[Unit 48 - Line Generalization](#) (Robert McMaster)

N. Visualization

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[Unit 50 - Color](#) (Jon Kimerling)

APPLICATION ISSUES IN GIS

O. GIS application areas

[Unit 51 - GIS Application Areas](#) (David Cowen & Warren Ferguson)

[Unit 52 - Resource Management Applications](#) (John Bossler)

[Unit 53 - Urban Planning and Management Applications](#) (Robert McMaster)

[Unit 54 - Cadastral Records and LIS](#) (Frank Gossette)

[Unit 55 - Facilities Management \(AM/FM\)](#) (Warren Ferguson)

[Unit 56 - Demographics and Network Applications](#) (David Cowen)

P. Decision-making in a GIS context

[Unit 57 - Decision Making Using Multiple Criteria](#) (Peter C. Keller)

[Unit 58 - Location-Allocation on Networks](#) (NCGIA)

[Unit 59 - Spatial Decision Support Systems](#) (Paul Densham)

Q. System planning

[Unit 60 - System Planning Overview](#) (Frank Gossette, Warren Ferguson & Ken Dueker)

[Unit 61 - Functional Requirements Study](#) (Warren Ferguson)

[Unit 62 - System Evaluation](#) (Warren Ferguson)

[Unit 63 - Benchmarking](#) (NCGIA)

[Unit 64 - Pilot Project](#) (Warren Ferguson)

[Unit 65 - Costs and Benefits](#) (Holly J. Dickinson)

R. System implementation

[Unit 66 - Database Creation](#) (NCGIA)

[Unit 67 - Implementation Issues](#) (Ken Dueker)

[Unit 68 - Implementation Strategies for Large Organizations](#) (Ken Dueker)

S. Other issues

[Unit 69 - GIS Standards](#) (NCGIA)

[Unit 70 - Legal Issues](#) (Earl Epstein)

[Unit 71 - Development of National GIS Policy](#) (NCGIA)

[Unit 72 - GIS and Global Science](#) (Helen Mounsey)

[Unit 73 - GIS and Spatial Cognition](#) (Suchi Gopal)

[Unit 74 - Knowledge Based Techniques](#) (David Lanter)

[Unit 75 - The Future of GIS](#) (David Simonett)